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Remarks

U.S. Department of Agriculture • Office of Information

Address By Secretary of Agriculture Clayton Yeutter to the United Nations, October 17, 1989 at New York, New York.

Mr. Secretary General, President Garba, Director General Saouma, Ambassador Mortensen and distinguished guests. I am honored to join you in celebrating World Food Day.

My particular thanks to Director General Saouma for this opportunity to share with you some of my thinking on food, the environment and the agricultural challenges ahead.

Without implying Malthusian pessimism, let me say that these challenges will be formidable.

It took until 1950 to populate the earth with 2.5 billion people. Then, by mid-1987, we had added the next 2.5 billion—in less than 40 years.

Right now there are about 5.2 billion of us and even though birth rates have slowed significantly, demographics dictate that it will still be some time before population growth stabilizes.

Currently, we're adding almost a billion people to the earth's population every decade. That's about one more China or India or four USA's to feed every 10 years!

By the year 2025, there will be about 8.4 billion of us, competing for the same natural resource base. Only by the rational application of knowledge and science, combined with rational economic and environmental decisions, can we multiply those resources to the level that will soon be needed.

To add even more urgency to the situation, 95 percent of those additional 3.2 billion people will be living in the less developed nations. Most will be born into rural areas—where economic and environmental stresses are often the heaviest.

The question is, can we work together through organizations such as the United Nations to meet the food needs of all those additional people, while at the same time improving living conditions of the people already struggling for a better life?

Personally, I hold the strong opinion that we can progress and get the job done, if we have the political will to do so.

But it will require vast investments in internationally coordinated education, research and training—in addition to a commitment to preserving a healthy, life-sustaining global environment. We must work together to make political, economic and environmental decisions on the basis of science and rational thinking.

Fortunately, we have the communications tools, the knowledge base and the increasing levels of literacy to accomplish the needed tasks—if we will reach out to help one another.

If we work together to energize the tremendous reserves of human knowledge, applied skills and optimism waiting to be called into action in the developing countries as well as in the industrialized nations, then we will succeed.

The Challenges

There are several key areas.

- * The need to foster lasting economic growth while also alleviating the crushing debt problem now faced by many developing nations.

- * The need to eliminate current agricultural production distortions caused by protectionist trade barriers and farm subsidies.

- * The need to stretch known commercial energy supplies to meet demands that will increase rapidly, particularly in the developing countries.

- * The need to increase international research in global change, particularly the relationships between agriculture, industry and the environment.

Economic Growth and Third World Debt

The debt load in many developing countries is causing substantial declines in both the rate of capital formation and the rate of economic growth.

Excessive debt loads have also been the major cause of declining incomes, both in absolute and relative terms, in many developing countries.

Developing country real income growth per capita dropped from more than 3.1 percent per year during the 1970's to less than 1.4 percent per year in the 1980's.

The negative effects of all this reach directly into the industrialized countries as well as the debtor nations themselves.

The debt problem is not a regional or developing nation problem; it is a global problem requiring global solutions.

Take, as an example, what has happened to the real level of overall U.S. trade with the developing nations in the 1980's. It has declined an average of two percent a year, as indebted nations have struggled to meet ever increasing financial loads caused by heavy debt repayment schedules.

Currently, there is a real risk that the most heavily affected nations might inexorably withdraw from the world trading system altogether, as they strive to shut off the flow of capital out of their economies.

We can not stand by and let this happen. It is in the best interests of all nations, rich or poor, to help the debtor nations find solutions to their economic problems.

Poverty is the worst enemy of both human beings and the global environment.

It is in the poorest nations that industries can least afford the luxury of cleaner manufacturing methods, emission controls on automobiles and safe disposal of toxic wastes.

It is the lowest income farmers who are forced to farm fragile and erodible land or to allow livestock to overgraze land.

It behooves us to work together in initiating better financial and economic policies in both borrowing and lending nations. The benefits of renewed growth in the developing countries will accrue to us all.

The United States is attempting to find solutions through application of the Brady Plan. We are calling for the International Monetary Fund, the commercial banking system, the international development banks and the United Nations and its specialized agencies to all help move the world economy beyond this temporary, but serious, stumbling block. We invite your help and your suggestions in this process.

Trade Barriers and Agricultural Subsidies

Developing nations and industrialized countries alike need to adopt sound fiscal and monetary policies, in addition to rational trade and political solutions conducive to economic growth. To meet the population challenges of the coming decades, we can no longer afford policy distortions that result in inefficient use of limited economic and environmental resources.

The protectionist trade barriers that currently permeate our world trade system throw up a serious barrier to the rational development of export

industries needed in the developing countries if they are to meet the economic, environmental and population challenges now coming.

We must jointly recognize and acknowledge that removal of trade distorting policies in industrialized nations will also help facilitate the reform of developing countries' economies. All nations stand to gain by such reform.

The United States, the European Community, Japan and other industrialized nations have historically employed an array of domestic agricultural policies and restrictive trade policies that influence agricultural markets and foreign exchange earnings of developing countries.

The effect of these policies has been to increase agricultural production in the industrial nations and to reduce world commodity prices. This discourages agricultural production in developing countries and diminishes their potential export earnings. And since agriculture is such a large and vital component of their economies, it's safe to say that long-term economic growth in the developing countries has been adversely affected.

Studies indicate that the agricultural policies of the industrial countries have cost developing countries over \$16 billion in lost annual income in recent years (based on a 1986 analysis).

The European Community's agricultural and trade policies have taken the heaviest toll costing the developing countries about \$8 billion annually.

Japanese and U.S. agricultural policies have carried negative annual impacts of about \$4 billion each to the developing countries.

One thing is clear. Agricultural policies that make sense in an isolated market do not necessarily make sense in a global marketplace—and it is a global marketplace which prevails today and will prevail in the future.

Every nation, developing and industrialized alike, must begin to break from the old pattern of stimulative price/income supports backed by restrictive trade barriers.

Otherwise, the entire global population suffers—and the pressure on environmental resources continues to intensify in the poorest areas that can least afford it.

Worldwide, agricultural subsidies and protectionist trade policies cost consumers as much as \$150 billion a year.

The Uruguay Round of the GATT negotiations, which is currently scheduled to draw to a conclusion in 1990, offers an immediate means to reduce these costs—and to enhance the economic and environmental well-

being of all people, in all nations. I ask each of you for your strong support in bringing this all-important trade policy negotiating round to a successful conclusion.

Freeing up trade and eliminating barriers to efficient agricultural production must be done if we are to win the battle against global hunger and environmental degradation in the next 35 years.

Energy Use

The cost and availability of energy heavily affects agricultural production and the resulting cost of food.

The good news is that since the oil price shocks of the early 1970's, the industrialized nations—which currently consume more than 70 percent of the world's commercial energy—have become much more energy efficient.

Energy intensity (which is the amount of energy used to produce a unit of gross national product) fell by one fifth between 1973 and 1985.

U.S. gross national product during the period grew 40 percent while our energy consumption remained constant. Increased energy use efficiency made up the difference.

Developing countries today use relatively less energy, but demand is increasing rapidly and will accelerate as population pressures increase.

The challenge, both for agriculture and industry, will be for the industrialized countries to assist the developing nations in building improved energy efficiency into their emerging infrastructures, thus leapfrogging some of the older technologies that were so costly in terms of energy usage.

If we can accomplish gains in energy efficiency in the developing nations, it will help reconcile the simultaneous goals of economic development and environmental protection. Energy efficiency saves capital and generally decreases the production of carbon dioxide; sulfates, which cause acid rain; and excessive hydrocarbons.

Increased Research in Global Change and the Environment

I would like to conclude my remarks to you today by exploring a vitally important area: The need for internationally coordinated research in global change and the environment.

The earth along with its waters and atmosphere represents a closed environment, and the difficult economic and social choices I have been discussing with you carry a significant environmental impact.

We have much to learn about how our interaction with the environment affects it. The current public discussion about global warming, fostered primarily through our own industrial and agricultural activities, is good. It is rapidly becoming the focal point for increased cooperation in global environmental research.

Years from now I believe we will look back at this time as a major turning point—a point at which historic forces converged to create a new internationalism and a new, broader understanding about how our agricultural, economic and industrial activities affect the earth's environment.

A tremendous amount of good environmental work is already being done, and the United Nations Conference on the Environment and Development planned for 1992 can help us all share the results of that work.

Much of our problem in dealing with world environmental problems stems from a lack of good data and forecasting models. The U.N. is making a valuable contribution here as well. The U.N. environment program has been especially active in the worldwide data collection needed to assess the actual level of damage to the environment now occurring, and to develop strategies to deal with it.

In the U.S., our own ability to predict environmental change and respond to it should improve considerably as a result of the U.S. Global Change Research Program announced recently by the President. Funding for this type of research next fiscal year is expected to be more than \$190 million, a 43-percent increase over current levels.

We also intend to strengthen U.S. agricultural research on issues related to the environment. USDA has proposed a new initiative to Congress to conduct research and education to help farmers use pesticides more safely and effectively. We are also looking carefully at low input sustainable agriculture as a method of addressing environmental concerns.

On-going work in integrated pest management will continue, as will research on the bio-control of pests, and breeding plants that are hardier and more resistant to drought and disease.

Some of the advances we are seeing now in biotechnology are truly exciting and will also have major implications for world food supply and our ability to produce it in an environmentally sound fashion.

Most importantly, we remain firmly committed to sharing the results of this research with other countries worldwide. I might add that our scientific community is also quite excited about the fine quality of

agricultural research now coming from an ever-increasing number of national and regional research projects in the developing nations.

FAO itself is to be commended for the work it does to implement the results of this research in the field. A fine example is the work being done under its Tropical Forestry Action Plan (TFAP), elements of which have been adopted in more than 60 tropical countries.

By promoting conservation, reforestation and agroforestry, FAO is making an invaluable contribution to improving the lives of more than a billion people now suffering from a lack of fuel wood, plus the flooding and poor crop yields that can stem from the loss of tropical forests. The U.S. government and the U.S. forestry community recognizes the key role of FAO in coordinating TFAP.

At USDA, we have also supported FAO's work in mapping the world's soil resources and in formulating soil and water conservation strategies and the principles outlined in the World Soil Charter.

We feel FAO has made yet another valuable contribution to the global environment in getting member nations to agree to a code of conduct on pesticides. This, in conjunction with the work being done in the GATT to agree on the harmonization of sanitary and phytosanitary measures in food safety, will go a long way to help improve the world food supply.

Another member of the UN family, the world food program, is currently investing \$1.5 billion in 157 projects promoting environmentally sustainable development. This is to be commended. Also, your food-for-work projects are devoting more money to reforestation than any other development agency worldwide. You are to be congratulated in your efforts.

Conclusion

I want to thank you once again for the opportunity to be here today. While I want to close on an optimistic note about our ability to meet the agricultural and environmental challenges ahead—because that is absolutely how I feel—I also want to utter one important word of concern.

We will succeed in meeting the food production challenges I've outlined only through all-out application of increased scientific research, coupled with coordinated international efforts to adapt modern agricultural technology to local conditions and cultures.

We must never let rational concern for the environment be used as an excuse to step backward from science and technology. To view all use of agricultural chemicals as harmful, or to view advances in biotechnology with irrational suspicion—as is now being promoted in some quarters—makes no sense at all.

This is not a time to slow our application of science in agriculture. It is a time to speed up and learn well and wisely.

Thank you.

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News Releases

U.S. Department of Agriculture • Office of Information

USDA ANNOUNCES PREVAILING WORLD MARKET PRICE FOR UPLAND COTTON.

WASHINGTON, Oct. 12—Under Secretary of Agriculture Richard T. Crowder today announced the prevailing world market price, adjusted to U.S. quality and location (adjusted world price), for Strict Low Middling (SLM) 1-1/16 inch (micronaire 3.5-4.9) upland cotton (base quality) and the coarse count adjustment in effect from 12:01 a.m. Friday, Oct. 13, through midnight Thursday, Oct. 19.

Since the adjusted world price (AWP) is above the 1987, 1988 and 1989 crop base quality loan rates of 52.25, 51.80 and 50.00 cents per pound, respectively, the loan repayment rates for the 1987, 1988 and 1989 crops of upland cotton during this period are equal to the respective loan rates for the specific quality and location.

The AWP will continue to be used to determine the value of upland cotton that is obtained in exchange for commodity certificates. Because the AWP in effect is above the established loan rate, loan deficiency payments are not available for 1989-crop upland cotton sold during this period.

Based on data for the week ending Oct. 12, the AWP for upland cotton and the coarse count adjustment are determined as follows:

Chart on next page.

Adjusted World Price	
Northern Europe Price	82.36
Adjustments:	
Average U.S. spot market location	12.26
SLM 1-1/16 inch cotton	2.20
Average U.S. location	0.39
Sum of Adjustments	<u>-14.85</u>
ADJUSTED WORLD PRICE	67.51 cents/lb.

Coarse Count Adjustment	
Northern Europe Price	82.36
Northern Europe Coarse Count Price	<u>-77.40</u>
	4.96
Adjustment to SLM 1-inch cotton	<u>-4.75</u>
COARSE COUNT ADJUSTMENT	0.21 cents/lb.

The next AWP and coarse count adjustment announcement will be made on Oct. 19.

Charles Cunningham (202) 447-7954

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USDA ANNOUNCES CHANGES IN REQUIREMENTS FOR LIVESTOCK EXPORTED TO MEXICO

WASHINGTON, Oct. 16—The U.S. Department of Agriculture is advising exporters of U.S. livestock to Mexico that they should be aware of Mexico’s revised import requirements, which became effective Oct. 1 as a result of bilateral negotiations.

“The new requirements represent a significant lifting of some restrictions imposed earlier this year on animals shipped for slaughter but retain some recent requirements for breeding animals,” said James W. Glosser, administrator of USDA’s Animal and Plant Health Inspection Service. “For example, Mexico has lifted the restriction that only castrated male cattle, swine, goats, sheep, and horses could be exported for slaughter. Yet cattle exported for breeding must be tested for vibriosis.”

Glosser said that all exporters must have an import permit from Mexico and a U.S.-origin health certificate issued by an authorized veterinarian, endorsed by an APHIS veterinarian and visaed at a Mexican Consular Office. All livestock also must be unloaded at the border and inspected by a Mexican veterinarian.

Cattle shipped for slaughter no longer must be identified by a “U” brand, Glosser said. Instead they must be individually identified by ear tags. Slaughter sheep, goats and swine may enter for consignment to any slaughterhouse. Horses and cattle, except steers, may be shipped only to federally inspected plants. Steers may also go to facilities that are not federally inspected if the animals have been tested for tuberculosis. Tuberculosis testing is no longer required for other slaughter animals.

Glosser said that, although Mexico is maintaining the vibriosis test for breeding cattle, Mexico has lifted certain requirements for breeding animals. It removed the piroplasmosis and encephalomyelitis testing previously required for breeding horses. The test for transmissible gastroenteritis for breeding swine was also removed.

“APHIS and USDA’s Foreign Agricultural Service worked together to give U.S. livestock producers better access to Mexico’s market by ensuring that health requirements are based on sound biological concerns,” Glosser said. “Because of the new changes, exporters should carefully review the conditions listed on their permits.”

Potential exporters can obtain more information on Mexico’s revised import requirements by calling the APHIS area veterinarian in charge in their state.

Janna Evans (301) 436-7251

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FSIS AWARDS CONTRACT TO NAS FOR STUDY OF CATTLE INSPECTION

WASHINGTON, Oct. 16—The U.S. Department of Agriculture’s Food Safety and Inspection Service has awarded a \$154,000 contract to the National Academy of Sciences for an expert review of FSIS’ Streamlined Inspection System (SIS) for cattle slaughter.

The NAS Institute of Medicine will name six experts from among the fields of veterinary medicine, public health and meat science to provide an independent assessment of the inspection system, according to FSIS

Administrator Dr. Lester M. Crawford. "Next summer, the group will report on its evaluation of the new inspection system as compared with the traditional approach, and on FSIS monitoring of meat for chemicals and disease-causing organisms," Crawford said.

In the course of the study, the experts will review FSIS studies, visit four plants—two operating with traditional inspection methods and two with SIS—and hold a public meeting.

SIS for cattle is designed to eliminate unnecessary steps by combining two inspection stations so that cattle carcasses and viscera can be examined together, and to focus inspection on detecting disease conditions with public health significance. FSIS has been pilot testing the system in five slaughter plants since 1984.

Since publishing proposed regulations on SIS for cattle slaughter on Nov. 30, 1988, FSIS has received 338 comments from industry representatives, outside organizations, consumers and inspectors.

"After reviewing these comments, we have decided that an objective evaluation may provide answers to many of the questions raised," Crawford said. "NAS, which in 1985 compared the FSIS program to its concept of an 'optimal' inspection system, is uniquely qualified to advise us at this juncture in the rulemaking process."

FSIS operates inspection programs in slaughter and processing plants around the country to ensure that meat and poultry are safe, wholesome and accurately labeled.

Jim Greene (202) 382-0314

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USDA ANNOUNCES 1989 COUNTY CROP SOYBEANS LOAN AND PURCHASE RATES

WASHINGTON, Oct. 17—County loan and purchase rates for 1989-crop soybeans were announced today by Keith Bjerke, executive vice president of the U.S. Department of Agriculture's Commodity Credit Corporation.

The 1989 county rates for the first time reflect relative county market prices arrived at by the same method for determining county posted prices used for the exchange of CCC commodity certificates.

In setting the county rates, consumption trends and other pertinent data were considered.

Copies of the soybean county rate schedules are available from the Cotton, Grain and Rice Price Support Division, USDA-ASCS, P.O. Box 2415, Washington, D.C. 20013.

Bob Feist (202) 447-6789.

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SHRINK ADJUSTMENT ANNOUNCED FOR 1988-1990 CROPS OF PEANUTS

WASHINGTON, Oct. 17—The U.S. Department of Agriculture's Commodity Credit Corporation has asked for public comment on its adoption of a 4.5- percent shrink adjustment for the 1988 through 1990 peanut crops for handlers of contract additional peanuts operating under the "nonphysical supervision" option.

Nonphysical supervision means there is no supervisor present.

For qualified handlers, this is a 2.5 percent increase from the shrink adjustment previously allowed. Details were published as an interim rule in the Oct. 4 Federal Register and reflect a recent statutory amendment requiring that shrink adjustment may not be less than 4.5 percent.

The shrink adjustment to the quantity of "additional peanuts" otherwise required to be exported or crushed by handlers is provided to allow for the loss in value of the peanuts during handling and processing.

Additional peanuts are peanuts not eligible to be marketed as quota peanuts.

Nonsupervised handlers who have not certified to the restricted use of peanuts of certain "other edible quality" grades will not qualify for the 4.5-percent shrink adjustment. For those handlers the maximum shrink adjustment will remain at 0.5 percent.

Comments concerning the interim rule must be received by Nov. 3 and should include the basis for any recommendation. Send comments to: Director, Tobacco and Peanuts Division, ASCS/USDA, P.O. Box 2415, Washington, D.C. 20013. The comments will be available for public inspection in Room 5750-S of USDA's South Building, 14th Street and Independence Avenue, S.W., during normal business hours.

Robert Feist (202) 447-6787.

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USDA REMAINS IN HIGH GEAR TO COUNTER HUGO'S DEVASTATION

WASHINGTON—With its regional personnel still working extended shifts in some cases, the U.S. Department of Agriculture has spread its resources along the wake of Hurricane Hugo in South Carolina.

Several USDA agencies have restationed workers in the state's most devastated counties to distribute food, water and emergency food stamps, help with the clean-up, assess damages and provide financial assistance to help repair the rural electric and telephone systems and damage to farms, according to Deputy Secretary of Agriculture Jack C. Parnell.

The Food and Nutrition Service, USDA's lead agency in the emergency, set up a command center in Columbia soon after the skies began to clear to coordinate the transfer of USDA commodities to the areas where they are needed and distribute food stamps to the estimated 230,300 households in need of emergency food assistance.

For FNS, the work began two days before the hurricane hit, as staffers from the Southeast Area Regional Office provided state agency food stamp offices with information kits containing instructions on the emergency distribution of food stamps to help cut the red tape.

After Hugo swept through the area, the FNS regional office deployed 60 employees to South Carolina disaster sites to provide assistance in the relief and recovery process.

"Even with the pre-hurricane activity," said Phil Turner, FNS regional food stamp director, "by being on-site, we could eliminate a lot of the natural and understandable confusion between the Federal Emergency Management Agency, South Carolina state officials and FNS, and also make sure the right questions were being asked."

Since the FNS operations began, more than 1.5 million pounds of USDA surplus food commodities and more than \$61.5 million in emergency food stamps have been provided to the 23 counties (half the counties in the state) declared disaster areas. "USDA is putting mighty huge sums of dollars into this state to help the residents get through this situation," Turner said.

Hugo's swath churned up similar activity in the U.S. Virgin Islands and Puerto Rico. To help the 70,000 U.S. victims in the Caribbean, USDA authorized \$9 million in food assistance, and FNS coordinated food shipments of more than 4.2 million pounds to the Virgin Islands.

USDA's Forest Service also shifted into high gear in South Carolina. Donald Eng, supervisor of the Francis Marion and Sumter National Forests, said, "Our highest priority is community and employee assistance. Forest service personnel are helping residents remove debris and clear the roads at every possible opportunity.

"Our crews reopened a doctor's office, hauled water, used pumpers to clean houses, moved furniture and opened nearly every street in McClellanville and roads in the Witherbee area," Eng said.

With every disaster, there are immediate problems to handle. Getting back to normal, however, is a long-term proposition.

USDA's Soil Conservation Service dispatched special survey teams to South Carolina, North Carolina, Puerto Rico and the Virgin Islands to estimate the damages to streams, drainage ways, bridges and dams.

Reports show an estimated \$100 million in damages in 21 South Carolina counties, with a total of 2,385 miles of stream channels clogged with sediment and debris. On-going surveys of the stream systems in Puerto Rico and the Virgin Islands currently have damages at \$5 million.

Clean-up, repairs and rebuilding are the next vital steps to reduce the potential for future flooding. While SCS activities are limited to technical assistance and some limited financial assistance at this time, the agency's activities are carried out under its emergency watershed protection program. Requests for emergency cleanup efforts must be sponsored by local government.

USDA's Farmers Home Administration is also on the scene in South Carolina. Like SCS, FmHA is looking at the longer-range picture, how to finance the clean-up and repairs.

"Many aren't quite sure what to tell their creditors right now," explained Paul Booth, FmHA county supervisor for Sumter County.

"They aren't sure about the status of their crops, such as whether the cotton picker is even going to be picking. Given the nature of FmHA's mission, our operation will accelerate farther down the road."

USDA's Rural Electrification Administration also has a role to play in Hugo's aftermath. REA representatives are coordinating with FEMA to assess the damages to rural electric and telephone systems. Loans will be made to restore power and communication to hundreds of thousands of rural customers who are served by REA borrowers in hurricane-damaged areas of South Carolina, North Carolina, Puerto Rico and the Virgin Islands.

So far, REA has expedited to borrowers advances on previously approved loans and replenished their working capital in the amount of \$10 million. Total estimated damage to REA financed systems in the four regions is estimated at \$250 million.

Edwin Moffett (202) 447-4026

Issued: Oct. 17, 1989

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USDA KEEPING TABS ON COCKROACHES

WASHINGTON, Oct. 17—Cockroaches are being “tailed” in Gainesville, Fla., so U.S. Department of Agriculture scientists can help homeowners close the door on these ancient pests.

Electronic sensors are being used to monitor cockroach movement around the clock and under a variety of environmental conditions like temperature and humidity, said Richard J. Brenner, an entomologist with USDA’s Agricultural Research Service.

“We want to know everything about these insects from the time they’re born to the time they die—where they go, what they do,” Brenner said. Nearly \$1.5 billion is spent nationwide each year on pesticides to control cockroaches, he estimated.

To find long-term solutions, Brenner and colleagues at the ARS Insects Affecting Man and Animal Laboratory in Gainesville have installed about 100 sensors in specially built “test attics” in a garage-size building. What the electronic spying is confirming, for example, is that roaches avoid areas of an attic where there is abundant air flow.

Brenner said the research is expected to expand next year from the attic to the walls of the test building. Some roaches use walls as a “highway” to attics where they thrive in stagnant air and moisture.

“We may actually be able to manipulate the environment around the home to repel cockroaches,” Brenner said.

Information from Brenner’s electronic surveillance already has helped scientists develop a new cockroach bait recently patented by ARS. Air Vent Inc. of Peoria, Ill. signed an agreement in February 1988 to support the research.

Brenner explained how ARS keeps cockroaches under 24-hour surveillance in an article appearing in the latest issue of Agricultural Research magazine.

Bruce Kinzel (301) 344-2739

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PUTTING A WILD RELATIVE OF WHEAT TO WORK BOOSTS PROTEIN

WASHINGTON, Oct. 19—Genes that boost protein in a wild relative of wheat may do the same for new durum and other wheat varieties, a U.S. Department of Agriculture scientist said today.

Durum wheat bred for higher protein could lead to more nutritious spaghetti, macaroni and pizza dough, said plant geneticist Leonard R. Joppa of USDA's Agricultural Research Service. He spoke today in Las Vegas at the American Society of Agronomy's annual meeting.

"Our newest breeding lines of durum wheat, with genes from wild emmer wheat, produce grain that is about one to two percent higher in protein," said Joppa. That means new durum wheats to be bred from his lines could have 15 to 16 percent protein instead of 14 percent.

The research also could speed progress toward boosting protein in wheats used for breads and other foods, said Joppa, a plant geneticist at the ARS Northern Crop Science Laboratory, Fargo, N.D.

Until now it's been tedious to breed higher protein durum and other wheat varieties by crossing different species, Joppa said. To make the job easier, he first bred three new durum-emmer lines. Each has a different chromosome from wild emmer wheat, and each chromosome holds genes that increase grain protein. Equally important, he said, none of the three lines has emmer chromosomes that could lower grain protein.

"Getting new varieties from these lines will be more elegant than starting with a wheat-emmer cross possessing undesired chromosomes that would have to be bred out," said Joppa. Someday the desired genes—rather than the entire chromosome they belong to—may be transferred even more easily through genetic engineering, he said.

Joppa laid the groundwork for the new durums nearly 20 years ago, when he started developing a set of 14 lines from two wheat varieties, Langdon and Chinese Spring. Each of these lines, called Langdon durum disomic substitutions, differs from the others by only a single pair of chromosomes. The complete set, developed about 10 years ago, helps geneticists locate chromosomes responsible for various inherited traits.

Joppa first crossed emmer to each of the Langdon lines and then backcrossed the offspring to the Langdon lines through several generations. This gave him a set of breeding lines, each of which had its own unique emmer chromosome. Through field studies, he found that

emmer genes for increased protein levels were located on chromosomes 2A, 5B and 6B in backcrossed wheats.

Current research by plant physiologist Edward L. Deckard of North Dakota State University may reveal why the emmer genes increase protein in the grain. Two possibilities are that proteins, or their chemical precursors, may move more efficiently from leaves and stems to the grain, or enzymes may enable the plant to convert more nitrogen compounds into protein.

Joppa is collaborating with other scientists who are interested in genetically engineering wheat to possess useful emmer genes. To lay the foundation for this, they will develop more wheat breeding lines with wild emmer chromosomes and map the location of particular emmer genes on the chromosomes.

At North Dakota State University, durum breeder Roy G. Cantrell aims to come up with new, conventionally bred varieties from Joppa's new lines. Five or more years of tests are generally needed before a new variety is ready for release, said Joppa.

Ben Hardin (309) 685-4011

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